Viral Hemorrhagic Fevers

Report Immediately

September 2004

Note: This chapter pertains to other than Ebola, Lassa, and Marburg hemorrhagic fevers. For information about Ebola, Lassa or Marburg hemorrhagic fevers, refer to appropriate chapters.

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Viral hemorrhagic fevers (VHFs) include numerous zoonotic diseases, all of which cause a hemorrhagic syndrome in humans. VHFs are caused by filoviruses, arenaviruses, bunyaviruses, and flaviviruses. Some of the specific VHFs include Ebola, Marburg, Lassa, Junin (Argentine VHF), Machupo (Bolivian VHF), Sabia (Brazilian VHF), Guanarito (Venezuelan VHF), Crimean Congo hemorrhagic and Rift Valley fever. Because of its extremely high fatality rate and the importation of the virus into the United States in non-human primates, Ebola hemorrhagic fever has been most publicized in the United States. VHFs have been recognized by the Centers for Disease Control and Prevention (CDC) as being among the top agents of concern for potential bioterrorist weapons.

B. Clinical Description and Laboratory Diagnosis

The onset of viral hemorrhagic fever is usually sudden. The duration of illness can vary from a few days to a couple of weeks. Patients may present with a brief prodrome characterized by nonspecific signs, including fever, headache, malaise, weakness, irritability, dizziness, muscle aches, and nausea and vomiting. As signs progress, they may include low blood pressure, sustained fever, sweats, rash, diarrhea, swelling around the eyes, flushing, and redness of the eyes. As signs become more serious, the patient becomes prostrate and may develop pain in the throat, chest, or abdomen, as well as petechiae and ecchymoses (bruises). Bleeding occurs from mucous membranes manifested by nosebleeds and bleeding gums, and blood in vomit, urine, stools and sputum. The patient will often go into shock. Encephalopathy, hepatitis, intention tremors, and reduced white blood cell and platelet levels are frequently seen, and renal failure may occur. Mortality rates for VHFs vary depending on the agent and strain, and can be from 10% to 90%. Laboratory diagnosis depends on the agent but generally is based on identification of specific antibodies in blood, serum or tissue homogenates, or identification of specific nucleic acids, or virus isolation by culture. **For the majority of agents causing VHFs, laboratory studies represent an extreme biohazard and testing will be done by CDC.**

C. Reservoirs

Many wild and domestic animals, ticks, and mosquitoes are known to carry some of the VHF agents, although the reservoirs have not been identified for all VHF agents. Rodents are known to be the carriers of Lassa (Africa), Junin, Machupo, Guanarito (South America), Crimean Congo hemorrhagic fever (Eastern Europe, Middle East, Pakistan, China, tropical and South Africa) and Rift Valley fever viruses (Africa). Mosquitoes, ticks and animals (including rodents, foxes, hares, and ground feeding birds) are known to carry bunyaviruses that cause VHF. Non-human primates are the only animals known to have been affected by Ebola and Marburg hemorrhagic fever viruses. However, because these infections are associated with a rapid and often fatal illness in these animals, they are not considered reservoirs. Once certain VHF viral infections establish themselves in human populations, rapid person-to-person spread may occur.

D. Modes of Transmission

Animals, ticks or mosquitoes serve as the vector for transmission of VHFs to the index case. Once a human has acquired infection with a VHF agent, transmission may occur person-to-person. Persons become infected through contact with infectious blood or secretions from infected persons or animals. Individuals have acquired VHFs through sexual contact. Bedding or other fomites may serve as a source of infection. Medical equipment that has not been properly cleaned or sterilized has been responsible for the spread of some VHFs, and rare cases have been acquired by laboratory workers manipulating specimens.

For most VHFs, direct physical contact with infectious blood or secretions is thought to be required for transmission. However, for some VHFs, such as some of the arenaviruses, aerosol spread is considered likely.

E. Incubation Period

The incubation periods for VHFs range from 1 to 21 days, with an average of 3 to 10 days.

F. Period of Communicability or Infectious Period

Infected individuals are generally considered infectious for a variable period preceding the onset of symptoms (up to about 3 weeks for some VHFs) and during the course of clinical symptoms. The virus may remain in the blood and secretions for months after an individual recovers. Contaminated bedding and medical equipment may remain infectious for several days.

G. Epidemiology

Viruses of VHFs are primarily infectious agents in wild animals, birds, mosquitoes and ticks. Individual VHFs occur in different geographic regions. VHFs Junine, Machupo, Sabia and Guanarito occur in South America, Rift Valley VHF occurs in Africa, and Crimean Congo HF occurs in Euroasia and Africa. Outbreaks, when they occur, tend to be sporadic. Up to date approximately 20 cases of travel-related Lassa fever have been described in the U.S., including one case related to travel in Africa (Liberia) involving New Jersey citizen in 2004.

H. Bioterrorist Potential

The viruses that cause VHFs are considered potential bioterrorism agents. If acquired and properly disseminated, these viruses could cause a serious public health challenge in terms of ability to limit the numbers of casualties and control other repercussions from such an attack.

2) REPORTING CRITERIA AND LABORATORY SERVICES

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

There is no formal NJDHSS or CDC case definition for VHFs.

Report any illness suspected by a healthcare provider of being caused by VHF. Report any potential exposure to an agent that could cause VHF.

B. Laboratory Testing Services Available

The NJDHSS Public Health and Environmental Laboratories (PHEL) do not provide services for testing clinical specimens for VHFs. However, the CDC offer testing.

After consulting with NJDHSS Infectious and Zoonotic Diseases Program **(**IZDP), arrangements can be made for sending specimens to the CDC through the PHEL Viral Serology Laboratory at 609.984.2622. IZDP and the Viral Serology Laboratory will provide guidance on what specimens to send and how to send them.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify potential sources of transmission which may exist in the United States (such as non-human primates or laboratory specimens).
- To identify sources of transmission and geographical areas of risk outside of the United States.
- To stop transmission from such sources and geographical areas.
- To identify cases as early as possible to prevent transmission to other persons or animals.
- To identify cases and clusters of human illness that may be associated with a bioterrorist event.

B. Laboratory and Healthcare Provider Reporting Requirements

NJDHSS requests that healthcare providers **immediately report** to the local health officer in the community where is diagnosed any suspect or known case of VHF or any potential exposure to an agent which could cause VHF. If this is not possible, call the NJDHSS IZDP at 609.588.7500 (weekdays), or 609.392.2020 (nights/weekends). Since the CDC is the principal testing laboratory for VHFs in the United States, the CDC would report any cases in New Jersey residents to NJDHSS, and NJDHSS would, in turn, notify the local health officer in the community where the patient resides.

C. Local Departments of Health Reporting and Follow-Up Responsibilities

1. **Reporting Requirements**
   a. The NJDHSS requests that information about any suspect or known case of VHF, or any potential exposure to an agent which could cause VHF, be **immediately reported** to the NJDHSS IZDP by calling 609.588.7500 (weekdays), or 609.392.2020 (nights/weekends).

2. **Case Investigation**
   a. **The most important step a health officer can take if he/she learns of a suspect or confirmed case of VHF, or any potential exposure to an agent which could cause VHF, is to call the NJDHSS IZDP** immediately**, any time of the day or night.** The daytime phone number of the IZDP is 609.588.7500. The emergency phone number for nights and weekends is 609.392.2020.

   b. Case investigation of VHF in New Jersey residents will be directed by the NJDHSS in conjunction with the CDC. If a bioterrorist event is suspected, the NJDHSS and other response authorities will work closely with local health officers and provide instructions/information on how to proceed.

   c. Following immediate notification of the NJDHSS, the local health officer(s) may be asked to assist in investigating any patient living within their communities, including gathering the following:
      1) The patient's name, age, address, phone number, status (hospitalized, at home, deceased), and parent/guardian information, if applicable.
      2) The name and phone number of the hospital where the patient is or was hospitalized.
      3) The name and phone number of the patient's attending physician.
      4) The name and phone number of the infection control professional at the hospital.
      5) If the patient was seen by a healthcare provider before hospitalization, or seen at more than one hospital. These names and phone numbers will be needed as well.

   d. Following immediate notification of the NJDHSS, the local health officer may be asked to assist in completing a CDS-1 form. A report can be filed electronically over the Internet using the confidential and secure Communicable Disease Reporting System (CDRS). Most of the information required on the form can be obtained from the healthcare provider or the medical record. Use the following guidelines in completing the form:
      1) Record "Viral Hemorrhagic Fever" as the disease being reported. If possible, record the type of VHF (*e.g.*, Junin, Machupo, Sabia, Guanarito, Crimean Congo hemorrhagic fevers or Rift Valley fever) suspected.
      2) Record the patient's demographic information.
      3) Record the date of symptom onset, symptoms, date of diagnosis, hospitalization information (if applicable), and outcome of disease (*e.g.*, the patient recovered, died).

4) Exposure history: Use the incubation period range for VHF (2–16 days, varying by etiologic agent). Specifically, focus on the period beginning a minimum of 2 days prior to the patient's symptoms onset date back to no more than 16 days before onset for travel history; determine the date(s) and geographic area(s) traveled to by the patient to identify where the patient may have become infected.
5) Complete the travel section to indicate where VHF was acquired. If unsure, check "Unknown."
6) Include any additional comments regarding the patient.
7) If there have been several but unsuccessful attempts to obtain patient information (*e.g.*, the patient or healthcare provider does not return calls or respond to a letter, or the patient refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as possible. Please note on the form the reason why it could not be filled out completely. **If CDRS is used to report, enter the collected information into the "Comments" section.**

After completing the form, it should be faxed to the NJDHSS IZDP, fax number 609.631.4863, or the report can be filed electronically over the Internet using the CDRS. Call the IZDP at 609.588.7500 to confirm receipt of your fax.
The mailing address is:

NJDHSS
Division of Epidemiology, Environmental and Occupational Health
Infectious and Zoonotic Diseases Program
P.O.Box 369
Trenton, NJ 08625-0369

e. Institution of disease control measures is an integral part of case investigation. It is the local health officer's responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4, "Controlling Further Spread."

1) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

1. Minimum Period of Isolation of Patient

Patients should be isolated until they are clinically well and then monitored. Because blood and secretions may contain virus for up to several months, patients must be educated and monitored for infectiousness. Negative semen or vaginal secretion cultures should be obtained from patients before they resume sexual activity. (Testing is currently done at only a few laboratories that maintain biosafety level 4 facilities [*e.g.*, CDC]).

2. Minimum Period of Quarantine of Contacts

See Section 4 B, Protection of Contacts of a Case, directly below.

B. Protection of Contacts of a Case

There is no immunization or prophylaxis for contacts of cases. Healthcare workers and other contacts of known or suspected cases of VHF should practice standard (including respiratory) precautions together with contact precautions to reduce their chances of acquiring VHF. Individuals who have had any contact with infectious patients should be monitored by their healthcare provider for the maximum incubation period for the specific agent. Health care providers should consult with IZDP staff regarding appropriate infection control precautions. For more detailed recommendation see "Management of Patients with Suspected Viral Hemorrhagic Fever—United States," MMWR 1995/44(25);475-479.

C. Managing Special Situations

If an outbreak is suspected, primary investigation will be handled by the NJDHSS. A source of infection, such as travel to a geographical region where a known outbreak of VHF is occurring, will be sought and applicable

preventive or control measures will be instituted. The NJDHSS can determine a course of action to prevent further cases and can perform surveillance for cases occurring across several jurisdictions, which would be difficult to identify at a local level. The local health officer may be asked to assist in the investigation to help determine the source of infection and to implement any necessary control measures. If a bioterrorist event is suspected, the NJDHSS and other response authorities will work closely with local health officers and provide instructions/information on how to proceed.

D. Preventive Measures

1. No environmental measures are necessary; VHFs do not occur naturally in New Jersey.
2. To avoid cases of VHF:
    a. Avoid traveling to areas with known outbreaks of VHF. For more information regarding international travel and VHFs, contact the CDC's Traveler's Health Office at (877) 394-8747 or through the Internet at <http://www.cdc.gov/travel>.
    b. Laboratory workers handling specimens suspected of containing the agents of VHFs must take appropriate precautions.
    c. Persons working with imported non-human primates (NHPs) should know the signs of VHF in NHPs; and **immediately report** any cases of suspect or confirmed VHF in NHPs to the NJDHSS.

ADDITIONAL INFORMATION

Additional information about VHF can be found on CDC website (http://www.cdc.gov/).

There is no formal CDC case definition for VHFs. CDC case definitions are used by the state health department and CDC to maintain uniform standards for national reporting. For reporting a case to the NJDHSS, always refer to criteria in Section 2 A of this chapter.

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